L45	L43 and emitter	0	L45
L44	L43 and RF	0	L44
L43	L42 and touch	3	L43
L42	L41 and processor	8	L42
L41	L40 and display	11	L41
L40	L23 and ("operating system")	14	L40
L39	L35 and ("operating system")	0	L39
L38	L35 and radiation	0	L38
L37	L35 and optical	0	L37
L36	L35 and emitter	0	L36
L35	L32 and processor	1	L35
L34	L32 and character	0	L34
L33	L32 and graphic	0	L33
L32	L31 and writ$3	1	L32
L31	L29 and software	1	L31
L30	L29 and program	0	L30
L29	L25 and radio with frequency	1	L29
L28	L25 and radiation	0	L28
L27	L26 and radiation	0	L27
L26	L25 and graphic	8	L26
L25	L24 and writing	17	L25
L24	L23 and display	34	L24
L23	Palm.as.	71	L23
L22	L21 and (touchscreen)	0	L22
L21	L20 and display	49	L21
L20	sony.as. and palm	62	L20
L19	L18 and display	4	L19
L18	Nec.as. and palm	21	L18
L17	L16 and touch	5	L17
L16	L14 and screen	8	L16
L15	L14 and circular	1	L15
L14	L13 and palm	9	L14
L13	L12 and character	9	L13
L12	L11 and program$4	11	L12
L11	L10 and graphi$ and writ$3	11	L11
L10	palm.as.	71	L10
L9	L6 and graphical	0	L9
L8	L6 and graphic	0	L8
L7	L6 and circular	0	L7
L6	L5 and character	1	L6

L5	L2 and software	1	L5
L4	L2 and program	0	L4
L3	L2 and program$4	0	L3
L2	L1 and writing	1	L2
L1	6188789	1	L1

END OF SEARCH HISTORY

WEST

Freeform Search

Database: US Patents Full Text Database
US Pre-Grant Publication Full-Text Database
JPO Abstracts Database
EPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Term: software with control$ and display$ with graph$ with touch$ with screen and operat$ with system and control$ with program$

Display: 10 **Documents in Display Format:** TI **Starting with Number** 1

Generate: ○ **Hit List** ◉ **Hit Count** ○ **Side by Side** ○ **Image**

Search | Clear | Help | Logout | Interrupt

Main Menu | Show S Numbers | Edit S Numbers | Preferences | Cases

Search History

DATE: Monday, August 19, 2002 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=OR			
L17	L16 and touch	5	L17
L16	L14 and screen	8	L16
L15	L14 and circular	1	L15
L14	L13 and palm	9	L14
L13	L12 and character	9	L13
L12	L11 and program$4	11	L12
L11	L10 and graphi$ and writ$3	11	L11
L10	palm.as.	71	L10
L9	L6 and graphical	0	L9
L8	L6 and graphic	0	L8
L7	L6 and circular	0	L7
L6	L5 and character	1	L6
L5	L2 and software	1	L5
L4	L2 and program	0	L4
L3	L2 and program$4	0	L3
L2	L1 and writing	1	L2
L1	6188789	1	L1

END OF SEARCH HISTORY

WEST

Print Selection

Help | Clear | Cancel | Print | Print First Page

Select?	Document ID	Section(s)	Page(s)	# Pages to print	Database
☐	6388870	all	all	21	USPT
☑	6388877	all	all	21	USPT
☑	6359270	all	all	25	USPT
☐	6359270	all	all	N/A	USPT
☐	6359270	all	all	N/A	USPT
☑	6337681	all	all	41	USPT
☑	4570217	all	all	* 294	USPT

Note: Print requests for more than **49** pages are denoted by '*' and are in red.

Building: cpk2 ▼ Room: 6r04 ▼ Printer: gbkgptr ▼

Main Menu | Logout

WEST

Help Logout Interrupt

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Search Results -

Terms	Documents
((361/$3).ccls.) and hand-held with computer	158

Database: US Patents Full-Text Database
US Pre-Grant Publication Full-Text Database
JPO Abstracts Database
EPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L4 and "optical radiation emitter" or "radio frequency radiation emitter"

Refine Search

Recall Text Clear

Search History

DATE: Saturday, August 24, 2002 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=OR			
L4	((361/$3).ccls.) and hand-held with computer	158	L4
L3	((361/$3).ccls.) and palm and receiv$ with writ$ with surface with area	0	L3
L2	L1 and writ$ with character	8	L2
L1	((361/$3).ccls.) and palm	410	L1

END OF SEARCH HISTORY

surface 163 one boundary surface of the space into which the thermoplastic rubber 162 will be injected. Heat energy from the injected hot rubber material 162 tends to plasticize the outer surface 163 of the already molded part 154 to form a somewhat homogeneously linked boundary region along the surface 163 of the molded part 154. The boundary region conforming with the surface 163 has been found to yield a strong bond between the two molded materials or parts 154 and 162. The bond is essentially leak proof. The co-molding process appears therefore ideal for forming various parts such as the described housing shells 14 and 37 with a combination of rigid structural portions with impact resistance and resiliently yielding elements for shock absorbing or sealing functions. The bond appears also not to be confined to a planar surface along the original surface 163. Instead the boundary surface 163 appears converted into a boundary region 163 having a depth along the original surface 163. The region 163 tends to permit a greater dispersion of shear forces. As a result, impact forces tend to become more evenly distributed and dispersed across the surface of the underlying co-molded parts, such as the top and base housing shells 14 and 37, when compared with a typical surface-adhered shock absorbing material.

Detailed Description Text (35):
FIG. 13 is a pictorial composite drawing of the frontal or upper housing shell 14, showing the housing shell 14 as viewed from below, looking at an interior or shallow cavity 226 of the upper housing shell 14. A major portion adjacent the upper end 19 of the housing 12 is taken up by a display screen area 227 which is an opening 227 in the upper housing shell 14. A peripheral seal 228 is located and adhesively attached to the inside of the upper housing shell 14 peripherally about the screen area opening 227. A touch sensitive screen 229 having a touch sensitive screen area 32 is aligned with and assembled to the screen area opening 227. Since the touch sensitive area 32 is responsive to the touch of a stylus, the sensing area 32 remains exteriorly exposed within the screen area opening 227 after full assembly of the data terminal 10. An LCD screen assembly 232, including a backing board and LCD address logic, is aligned with and assembled to a locating frame 233 such that circuit devices facing the locating frame 233 become aligned with respective device cavities 234, 235 or 236 in the locating frame 233, as an example. The locating frame 233 is aligned with the main logic board 219. An electroluminescent panel 239 (EL panel 239) is placed between the main logic board 219 and the locating frame 233 just prior to the assembly of the locating frame 233, the LCD screen assembly 232 and the EL panel 239 to the main logic board 219. The assembled elements are combined into a single larger subassembly by becoming sandwiched between the main logic board 219 and the locating frame 233 when the main logic board 219 is fastened to the locating frame 233 with screws 240. A memory module 242 is plugged into a memory connector 243 and held to the main logic board 219 by one or more screws 244 or equivalent fasteners.

Detailed Description Text (40):
FIG. 15 shows the memory card door 42 in greater detail. The door 42 is in major structural details identical to the battery door 41, except for its relatively larger size and a switch activator tab 283 and a memory card retention tab 284 which extend from the memory card door 42 inward into the space of the I/O board assembly 177. Both the battery door 41 and the memory card door 42 have a resilient, impact resistant co-molded rubber exterior and integrated door seal 285. Also both the battery door 41 and the memory card door 42 use the same quick release lock assemblies 43. The lock assembly 43 uses an outer quarter turn knob 286. The knob 286 has a stem 287 which protrudes through a bearing aperture 288 in the respective door 41 or 42 into the interior of the housing 12. An O-ring seal 289 peripherally seals off the aperture 288 after the assembly of the knob 286 to the respective door 41 or 42. A spring washer 291 is placed interiorly over the stem 287 and molded flats 292 on the end of the stem 287 engage corresponding flats 293 of a latch lever 294. A screw 295 attaches the latch lever 294 through a flat washer 296 to the stem 287.

Detailed Description Text (41):
FIG. 16 shows details of the memory card door 42 from an exterior direction, showing outer twist members 297 in the knob 286. The twist members 297 are preferably recessed within the confines of the knob 286. The knob 286 is recessed within a knob cavity 298 to protect the data terminal 10 from damage during a fall should the data

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Help Logout Interrupt

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Search Results -

Terms	Documents
L55 and processor	2

Database: US Patents Full-Text Database
US Pre-Grant Publication Full-Text Database
JPO Abstracts Database
EPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L56

Refine Search

Recall Text Clear

Search History

DATE: Monday, August 19, 2002 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
	DB=USPT; PLUR=YES; OP=OR		
L56	L55 and processor	2	L56
L55	L54 and user with interactive with display$	2	L55
L54	L53 and graph$ with "operating system"	15	L54
L53	software with control$ and display$ with graph$ with touch$ with screen and operat$ with system and control$ with program$	164	L53
L52	sony.as. and palm	62	L52
L51	L50 and writing	5	L51
L50	L49 and program$4	19	L50
L49	L48 and display	44	L49
L48	Hewlett.as. and palm	59	L48
L47	L43 and writing	3	L47
L46	L43 and graphic$3	1	L46

WEST

Generate Collection Print

L30: Entry 2 of 4 File: USPT Sep 29, 1998

DOCUMENT-IDENTIFIER: US 5815165 A
TITLE: Graphics processor

Brief Summary Text (1):
The present invention relates to a graphics processor, in particular a graphics processor for raster displays.

Brief Summary Text (3):
Raster displays intended to manage more than only simple text generally have the whole image stored on pixel level in a memory or buffer, that is if the image has the resolution 1000.1000, than there is a memory cell for each of the 1,000,000 pixels that form the image (pixel=picture element).

Brief Summary Text (4):
For very high resolution raster displays this memory or buffer has to be separate from, that is physically separated from for instance the program and working storage for the corresponding CPU.

Brief Summary Text (10):
In connection with image generation for very high resolution raster displays, a very high resolution laser printer or laser photo setter (which always work with very high resolution as compared to displays) it has, for the reasons given above, proved to be motivated to use special aids for general graphic functions, such as generation of lines (vectors) and characters/digits (symbols). Such graphics aids are located between the CPU and image buffer.

Brief Summary Text (11):
Such previously known systems are, however, characterised by the fact that read out of video information from the image buffer for the generation of the image on the display has to have priority over, that is has to block, writing of information into the image buffer if an undisturbed image is to be guaranteed and if the video frequency is high, which is the case in a display system with very high resolution. This statement concerns common dynamic memory circuits, so called DRAM. For this reason there are special image buffer circuits, so called video-RAM, which have an extra output from an internal shift register in order to make it possible to read data without blocking the writing operation into the image buffer. However, these circuits are significantly more expensive than common DRAM circuits.

Brief Summary Text (13):
An object of the present invention is to provide a graphics processor, in particular for raster displays, but also for for instance laser printers or laser photo setters, that significantly reduces or eliminates the waiting times in connection with the writing of information into the image buffer.

Brief Summary Text (19):
Briefly stated the invention implies that instructions related to graphical operations such as drawing lines, poly lines, circles, writing text, filling areas, erasing windows, etc., by a first processor are converted into a series of instructions that are directly related to the writing of pixels into the image buffer and that are executed by a second processor, a queue memory that is separated from said image buffer being used for storing the last mentioned instructions.

Detailed Description Text (3):

displaying invoice information are deactivated, so as not to receive touch sensitive input, no changes can be made at the time the acknowledgment is requested. The use of alphanumerical data collection is further advanced by character recognition algorithms for processing and storing actual data in response to hand-produced inputs to the screen. For example, the display may provide line spacings as guides for receiving written characters. Within such designated boundaries a sensed pattern of graphic inputs is compared to a character of information. The apparently matching character is displayed. The display is an immediate feedback as to whether the correct character has been recognized. If an incorrect character appears, a graphic correction is made as a deviation with respect to the displayed character. Various other advantages will appear from further description of a preferred embodiment of the invention.

Detailed Description Text (81):
Touch sensitive screens require electrical couplings to be made along horizontal and vertical peripheral borders of the display screen 515. Such electrical couplings are space consuming and need to be made in addition to bit-mapped display screen connections, which are also made along the peripheral borders of the display screen 515. All of such connection regions constitute inactive areas of the screen 515. Preferably, to make optimum use of inactive horizontal and vertical connection areas adjacent the active area of the display screen 515, those areas are used for displaying permanently printed information, such as grid indicators 538 and cursor indicators 539. The peripherally displayed information helps in delineating the keyboard area 534 with respect to the display screen 515. In further reference to FIG. 31, the active area 519 of the display screen 515 is of elongate configuration, thereby minimizing the lateral projection of the display screen 515 beyond the lateral boundaries 517 and 518 of the housing 512. However, because of the size of the display screen being greater in the vertical direction of the data terminal 510, it appears desirable to display long lines of data in the longitudinal direction of the screen, hence perpendicular to the direction in which data might normally be displayed on the screen 515.

Detailed Description Text (92):
Appendix B, entitled "PEN*KEY.TM. Programmers Technical Notes" contains further detailed descriptions of the software and operation of the present invention, in order to provide a thorough disclosure of the form and use of the present invention.

Detailed Description Text (93):
Appendix B1, entitled "PEN*KEY.TM. Programmers Technical Notes", Rev. B, dated August, 1994, including Section 2, 4, 6-9, 11-12, 14, 19 and 22-25, contains further detailed descriptions of the software and operation of the present invention, in order to provide a thorough disclosure of the form and use of the present invention.

CLAIMS:

1. A portable data collection terminal system comprising:

(a) a housing having, in a frontal side thereof, a display screen with a screen area having a boundary area thereabout with an overall width, said display screen including graphic data input means disposed within said screen area;

(b) an accessory pod, connected to said housing;

(c) an accessory device of said system associated with said accessory pod,

(d) a handgrip extension mechanism having a width dimensioned substantially less than the overall width of said boundary area and disposed on said housing, opposite said frontal side, such that said screen is shielded from accidental contact by a user when holding said handgrip extension mechanism;

(e) a handstrap secured to said terminal system so as to, cooperatively with the handgrip extension mechanism, facilitate holding said terminal system;

being disposed directly underlying said display screen and said graphic data input means during use thereof.

167. The portable data collection terminal system of claim 163, wherein said data input means comprises graphic data input means disposed coincident with said display screen.

169. The portable data collection terminal system of claim 163, wherein said data input means comprises both a keyboard and graphic data input means disposed coincident with said display screen.

(f) at least one activation switch adapted to activate said accessory device, and arranged for actuation by the hand gripping said handgrip extension mechanism; and

(g) wherein said accessory device is an automatic optical reader which is arranged so as to be directed toward indicia to be read by means of the hand gripping said handgrip extension mechanism.

17. The portable data collection terminal system of claim 16, wherein said digitizer display screen has graphic data input means for capturing signatures.

19. The portable data collection terminal system of claim 16, wherein said digitizer display screen comprises graphic data input means disposed generally coincident with the display screen area.

53. The portable computer terminal system of claim 52, wherein touch sensitive functions of the digitizer display screen are deactivated when the digitizer display screen is only displaying feedback on what has been entered by a user.

57. The portable computer terminal system of claim 56, wherein the digitizer display screen accommodates a graphic correction with respect to a character displayed if the character is incorrect.

99. The portable data collection terminal system of claim 98, wherein said display screen has a graphic data input arrangement for capturing signatures.

101. The portable data collection terminal system of claim 98, wherein said display screen comprises a graphic data input arrangement disposed generally coincident with said display screen.

112. A portable data collection terminal system comprising:

(a) a housing having, in a frontal side thereof, a frontal portion having a display screen with a screen area and a boundary area thereabout, said display screen including graphic data input means disposed generally within said screen area;

(b) an accessory pod structured to hold an accessory device of said system and connected to said housing;

(c) a handgrip extension mechanism having a width dimensioned less than a width of said boundary area and disposed on said housing, opposite said frontal side, such that said screen is shielded from accidental contact by a user when holding said handgrip extension mechanism; and

(d) a handstrap secured to said terminal system so as to, cooperatively with said handgrip extension mechanism, operatively facilitate holding of said terminal system.

113. The portable data collection terminal system of claim 112, wherein said graphic data input means is disposed generally coincident with said screen area.

114. The portable data collection terminal system of claim 113, wherein said graphic data input means includes a touch sensitive overlay to accept contact-type data input.

117. The portable data collection terminal system of claim 116, wherein said digitizer display screen accommodates a graphic correction with respect to a displayed character if said character is incorrect.

129. The portable data collection terminal system of claim 128, wherein touch sensitive functions of said digitizer display screen are deactivated as said digitizer display screen is displaying feedback of input entered by the user.

149. The portable data collection terminal system of claim 112, wherein said handgrip extension mechanism comprises a rear handgrip shell having a width dimensioned less than a maximum width of said frontal side, the rear handgrip shell

Data entry is further enhanced by a touch sensitive active screen area 32 which is provided as an overlay to extend over the entire area of the LCD screen 15. The touch sensitive active surface area 32 may be implemented in a currently preferred manner, for example, either through capacitive or resistive switching and sampling techniques to determine coordinates of a point on the surface area 32 against which a contact pressure is exerted. The overlay area 32 is essentially transparent, such that information displayed on the screen 15 remains clearly discernible. The touch sensitive area 32 is activated by a passive pen or stylus which may be used to contact a single or a sequence of definable area locations to delineate pen-written data or information. The intelligent contents of information entered via stylus may be interpreted by software contained within the data terminal 10. Such software may include graphics programs or may include OCR programs for character recognition. It would be possible, for example, that the touch sensitive active area 32 be selectively configured as a keyboard for manual input of alphabetical or special characters. As a further advantageous alternative, software may provide only part of the entire display screen 15 with special keys to be touch-activated by such a data input stylus. In a special case, data prompts may be scrolled up or down on the screen 15 and may be activated in the alternative by cursor positioning and depression of one of the keys 27 to indicate that the selection has been chosen, or by being touched with the stylus to indicate a corresponding selection. Stylus clips 33 and 34 provide, in combination with a recessed stylus cavity, a recessed stylus holder 35 at the lower end of the data terminal 10.

Detailed Description Text (10):
FIG. 2 shows the data terminal from its underside, showing prominently the base shell 37 of the housing 12. The pictorial view of the data terminal 10 shown in FIG. 2 also shows the upper end 19 of the housing 12. As can be seen, the parting line 36 between the frontal shell 14 and the base shell 37 of the housing 12 is not continuous across the upper end 19 of the housing 12. Instead, the upper end 19 shows a battery door 41 and a memory card door 42 both of which provide access to respective parts of the data terminal 10. The doors 41 and 42 are individually removable, such that access may be gained through either without opening the other. Each of the doors 41 and 42 features a quarter-turn quick release lock assembly 43. The quick release lock assemblies 43 are identical to each other, even though the battery door 41 is somewhat shorter than the memory card door 42, as can be ascertained from FIG. 2. A major body portion of the bottom shell 37 features a continuation of evenly spaced transverse grooves 44 in the lateral gripping regions 21 and 22 of the frontal shell 14 (see FIG. 1). The transversely arranged grooves 44 may be looked upon as being ornamental, but the grooves also enhance the roughness of the respective housing shells, thereby providing a better grip adhesion to decrease a risk that the data terminal 10 accidentally slips from the grip hands of an operator. Alternatively, the grooves 44 could be ridges. However, the grooves 44 are preferred and more readily molded than such ridges. The regions of both the upper and lower ends 19 and 20 show smoothly textured surfaces which are comparatively more resilient, impact shock absorbing rubber moldings. The doors 41 and 42 feature a rounded ridge 46 which continues transversely adjacent the upper end 19 all around the housing 12. Similarly impact resistant, resilient shock protective regions 47 and 48 of the base shell 37 and a corresponding shock protective region 49 of the frontal shell 14 offer protective shielding to the lower end 20 of the data terminal 20. In brief reference to FIGS. 1 and 2, it is to be noted that the upper end portion 17 is disposed at an angle of about seven degrees with respect to the lower end portion 18. The deviation of the two portions from a coextensive longitudinal direction serves better operator access to both the LCD screen and the keyboard 16, and the included angle between the two tends to position the LCD screen 15 away from damaging contact should the data terminal 10 fall with the screen 15 facing down.

Detailed Description Text (28):
Referring to FIG. 8, the molded part 154 is thereafter inserted into an second mold 157 which has molding cavities 158 and 159 in upper and lower mold shells 160 and 161, respectively. The cavities 158 and 159 are larger and of altered shape when compared to the first cavities 155 and 156. The molding cavities 158 and 159 not only receive the already molded part 154, but also allow space for the injection of a second molding material, as, for example, thermoplastic rubber material 162. The molded part 154 is disposed within the second mold 157 to form with its outer

FIG. 1 shows the stucture of a conventional system for a raster display. The system comprises a CPU-unit 10. Connections for data etc. can be shared through a suitably designed bus system. To cover several different possibilities the bus system has been included in CPU block 10 in FIG. 1.

Detailed Description Text (5):
Graphics processor 16 receives general graphics instructions of the type "draw lines" (poly line), "fill area", "write text" in accordance with for instance the GKS-standard. With such general graphics instructions the graphics processor then builds the image in image buffer 18. However, this can only be done when video generator 20 does not read from image buffer 18 to generate said video signal, that is in principle only when the ray of the raster display is turned off. Otherwise the writing into image buffer 18 would disturb the image on the display. This means that graphics processor 16 always has to wait for the pauses during which video generator 20 does not read information from image buffer 18 before it can convert said general graphics instructions into pixels in image buffer 18.

Detailed Description Text (12):
In accordance with a preferred embodiment of the system a description of the image (display list) comprising general graphics instructions with parameters and data is stored in working storage 14. When this description of the image is to be transferred to the display general graphics processor 30 reads instructions from this list to generate primitive pixel oriented instructions to queue memory 34. This can be done in a sequence without waiting times. In case general graphics processor 30 is separate from central processing unit CPU the image generation can even be performed automatically without the aid of CPU programs.

Detailed Description Text (68):
The structure in accordance with the present invention among other things makes it possible to use so called DRAM-circuits in the image buffer, since the proposed graphics processor is not as sensitive to the blocking of the image buffer during image generation. This implies significant economical advantages, since the video-RAM circuits used in conventional high resolution display systems are approximately three times as expensive as DRAM-circuits.

Detailed Description Text (69):
In the above specification the invention has been described in connection with image generation for a raster display. The same principles can, however, also be used in connection with for instance laser printers or laser photo setter where an entire printed page is built up by pizels stored in an "image buffer". The graphics processor in accordance with the invention therefore is not limited to only raster diplays.

Detailed Description Text (82):
Furthermore, for instance in connection with a laser photo setter it is important that primitive graphics processor 32 does not have to wait for general graphics processor 30. In this case it is true that the "image buffer" is not blocked since the image only is read once for each print out and not 60-70 times per second as for a display system, but on the other hand the resolution for a laser photo setter is very much higher which means primitive graphics processor 32 will have much more to do and has to work as efficient as possible for obtaining best performance.

Current US Original Classification (1):
345/506

Current US Cross Reference Classification (1):
345/519

Current US Cross Reference Classification (2):
345/536

CLAIMS:

5. The graphics processor for writing information into said image buffer of claim 1 wherein said image buffer comprises DRAM-circuits.

6. The graphics processor for writing information into an image buffer of claim 5, wherein said image buffer is connected to a display controller to display an image on a display and wherein said low level graphics processor means writes pixel data to said image buffer only during time periods when said display controller does not read pixel data from said image buffer.

78 Claims, 29 Drawing figures

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
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☐	4436393	March 1984	Vanderwerf	
☐	4684996	August 1987	Baumeister	348/747
☐	4710758	December 1987	Musslenetal	345/178
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OTHER PUBLICATIONS

"Artificial Reality", by Martin W. Krueger, Addison-Wesley Publishing Company, Inc., 1983, pp. vii-ix, xi-xiv, 18-40 and 55-75.

ART-UNIT: 2675

PRIMARY-EXAMINER: Saras; Steven

ASSISTANT-EXAMINER: Bell; Paul

ABSTRACT:

An interactive display system comprising a touch sensitive display surface for sensing pressure applied thereto and in response generating control signals indicating locations of the applied pressure, a personal computer for receiving the control signals and in response generating graph images, and an LCD panel in combination with an overhead projector for receiving and projecting the graphic images onto the touch sensitive display surface at the indicated locations. The LCD panel and overhead projector may be provided an an integral unit.

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L55: Entry 1 of 2 File: USPT Jan 8, 2002

US-PAT-NO: 6337681
DOCUMENT-IDENTIFIER: US 6337681 B1

TITLE: Projection display system with pressure sensing at screen, and computer assisted alignment implemented by applying pressure at displayed calibration marks

DATE-ISSUED: January 8, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Martin; David A.	Calgary			CA

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Smart Technologies Inc.	Calgary			CA	03

APPL-NO: 09/ 595976 [PALM]
DATE FILED: June 16, 2000

PARENT-CASE:
This application is a continuation of U.S. Ser. No. 08/477,498, filed on Jun. 7, 1995, abandoned, which is a continuation of U.S. Pat. No. 07/780,052, filed on Oct. 21, 1991, now U.S. Ser. No. 5,448,263.

INT-CL: [07] G09 G 5/00, G06 K 11/06

US-CL-ISSUED: 345/178; 345/173, 178/18.03
US-CL-CURRENT: 345/178; 178/18.03, 345/173

FIELD-OF-SEARCH: 345/1, 345/2, 345/3, 345/87, 345/156, 345/157, 345/158, 345/173, 345/178, 345/904, 345/326, 345/329, 345/330, 178/18.01, 178/18.02, 178/18.03, 178/18.09, 349/5, 349/6, 349/7, 348/95, 348/177, 348/180, 348/184, 348/190, 348/744, 348/745, 348/746, 348/747

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

10. Document ID: US 5908997 A

L54: Entry 10 of 15 File: USPT Jun 1, 1999

US-PAT-NO: 5908997
DOCUMENT-IDENTIFIER: US 5908997 A

TITLE: Electronic music instrument system with musical keyboard

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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Terms	Documents
L53 and graph$ with "operating system"	15

Display Format: TI Change Format

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Search Results - Record(s) 1 through 10 of 15 returned.

1. Document ID: US 6396516 B1

L54: Entry 1 of 15 File: USPT May 28, 2002

US-PAT-NO: 6396516
DOCUMENT-IDENTIFIER: US 6396516 B1

TITLE: Graphical user interface shop floor control system

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

2. Document ID: US 6359270 B1

L54: Entry 2 of 15 File: USPT Mar 19, 2002

US-PAT-NO: 6359270
DOCUMENT-IDENTIFIER: US 6359270 B1

TITLE: Communications module mounting for domestic appliance

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

3. Document ID: US 6346951 B1

L54: Entry 3 of 15 File: USPT Feb 12, 2002

US-PAT-NO: 6346951
DOCUMENT-IDENTIFIER: US 6346951 B1

TITLE: Process for selecting a recording on a digital audiovisual reproduction system, for implementing the process

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

4. Document ID: US 6337681 B1

L54: Entry 4 of 15 File: USPT Jan 8, 2002

US-PAT-NO: 6337681
DOCUMENT-IDENTIFIER: US 6337681 B1

TITLE: Projection display system with pressure sensing at screen, and computer assisted alignment implemented by applying pressure at displayed calibration marks

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

☐ 5. Document ID: US 6336053 B1

L54: Entry 5 of 15 File: USPT Jan 1, 2002

US-PAT-NO: 6336053
DOCUMENT-IDENTIFIER: US 6336053 B1

TITLE: Graphical user interface shop floor control system

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

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☐ 6. Document ID: US 6266236 B1

L54: Entry 6 of 15 File: USPT Jul 24, 2001

US-PAT-NO: 6266236
DOCUMENT-IDENTIFIER: US 6266236 B1

TITLE: Apparatus and method for connecting and articulating display in a portable computer having multiple display orientations

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

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☐ 7. Document ID: US 6211870 B1

L54: Entry 7 of 15 File: USPT Apr 3, 2001

US-PAT-NO: 6211870
DOCUMENT-IDENTIFIER: US 6211870 B1

TITLE: Computer programmable remote control

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 8. Document ID: US 6160213 A

L54: Entry 8 of 15 File: USPT Dec 12, 2000

US-PAT-NO: 6160213
DOCUMENT-IDENTIFIER: US 6160213 A

TITLE: Electronic music instrument system with musical keyboard

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 9. Document ID: US 6059842 A

L54: Entry 9 of 15 File: USPT May 9, 2000

US-PAT-NO: 6059842
DOCUMENT-IDENTIFIER: US 6059842 A

TITLE: System and method for optimizing computer software and hardware

WEST

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Generate Collection Print

L9: Entry 1 of 1 File: USPT Sep 8, 1998

DOCUMENT-IDENTIFIER: US 5805474 A
TITLE: Portable work station type-data collection system having an improved handgrip and an optical reader to be directed thereby

Drawing Description Text (6):
FIG. 4 is a pictorial representation of a docking device with a docking cavity for receiving and removably retaining the data terminal shown in FIGS. 1, 2 and 3 during storage, data transfer or battery charging operations;

Detailed Description Text (28):
Referring to FIG. 8, the molded part 154 is thereafter inserted into an second mold 157 which has molding cavities 158 and 159 in upper and lower mold shells 160 and 161, respectively. The cavities 158 and 159 are larger and of altered shape when compared to the first cavities 155 and 156. The molding cavities 158 and 159 not only receive the already molded part 154, but also allow space for the injection of a second molding material, as, for example, thermoplastic rubber material 162. The molded part 154 is disposed within the second mold 157 to form with its outer surface 163 one boundary surface of the space into which the thermoplastic rubber 162 will be injected. Heat energy from the injected hot rubber material 162 tends to plasticize the outer surface 163 of the already molded part 154 to form a somewhat homogeneously linked boundary region along the surface 163 of the molded part 154. The boundary region conforming with the surface 163 has been found to yield a strong bond between the two molded materials or parts 154 and 162. The bond is essentially leak proof. The co-molding process appears therefore ideal for forming various parts such as the described housing shells 14 and 37 with a combination of rigid structural portions with impact resistance and resiliently yielding elements for shock absorbing or sealing functions. The bond appears also not to be confined to a planar surface along the original surface 163. Instead the boundary surface 163 appears converted into a boundary region 163 having a depth along the original surface 163. The region 163 tends to permit a greater dispersion of shear forces. As a result, impact forces tend to become more evenly distributed and dispersed across the surface of the underlying co-molded parts, such as the top and base housing shells 14 and 37, when compared with a typical surface-adhered shock absorbing material.

Detailed Description Text (32):
Mounted to an upper surface 188 of the I/O board 177 is a PCMCIA connector 189. The PCMCIA connector 189 is of a double-slotted card connector capable of receiving two type II PCMCIA memory cards. First and second vertically layered guide tracks 191 and 192 receive first and second memory cards, respectively. A first card release button 193 and a second card release button 194 extend outward toward the upper end 19 of the housing 12. The release buttons 193 and 194 are accessible from the upper end of the housing 12 to selectively release a card from either one of the guide tracks 191 or 192 by a push of the respective release button. After assembly of the I/O board assembly 177 into the base shell 37, other components shown in FIG. 11 below the base shell 37 are assembled from or to the exterior of the base shell 37. A resilient pad or label 196 may be placed on the underside of the I/O board assembly 177 aligned with a site of a backup battery holder 197. The backup battery holder 197 is pushed into place on the underside of the I/O board assembly 177. A 9-volt battery 198 serves as backup battery for the data terminal 10. The backup battery 198 is connected to a connector terminal on the I/O board assembly 177 via a

terminal 10 be impacted suddenly against one or the other of the doors 41 or 42.

Detailed Description Text (47):
FIG. 21 depicts functional elements which are mounted on the special input-output function interface board 177 ("I/O BD"), further referred to as I/O board 177. An advantage of the use of the I/O board 177 as an addendum to, but as a separate structural element from, the main circuit board 219, for example, is an increased ease of assembly and a promotion of modular concepts. A use of modular concepts permits the data terminal 10 to be adapted to special uses. In reference to FIGS. 20 and 21, the preferred functional layout of a combination of the main circuit board 219 and the I/O board 177 shows that substantially all internal operational functions of the data terminal 10, those which are expected to remain the same for most, if not all, applications, are supported by the main circuit board 219. On the other hand, input-output functions may vary among different special use applications of the data terminal 176. The less permanently defined input-output functions are therefore found on the I/O board 177. The data terminal 10 may therefore undergo a basic functional modification by the removal of the I/O board 177 for a different I/O board with different input-output functions. Components on the main circuit board 219 need therefore not be changed. However, with changed input-output functions and parameters, a control program which would be resident in the flash memory 330 may need to be updated to account for changes in operating default settings of now different input-output functions as provided by a different I/O board.

Detailed Description Text (50):
A second desirable communications controller on the I/O board 177 is a Dual UART device 355. The Dual UART (Universal Asynchronous Receive and Transmit) device 355 is coupled internally of the data terminal 10 to the I/O signal and control bus 340 and for external communications to respective RS 232 and RS 485 control circuit devices 356 and 357, respectively. In furtherance of advantages obtained through a dual coupling function via both the connector 178 and surface contacts 106, standard connections of the RS 232 and RS 485 devices, 356 and 357, are also contemplated to be coupled to designated control and data terminations on the 28-pin connector 178 and respective ones of the surface contacts 106. The portable data terminal 10 may typically not be regarded as the type of device the usefulness of which may be enhanced by linking provisions to communication networks such as Ethernet. However, it has been discovered that a full function of the data terminal 10 is implemented only when an efficient operation of collecting data at the working level of a complex data system is supplemented by equally efficient communications with the data system. In furtherance of this, Ethernet capability is found to provide a communications link of significance. Ethernet may be used, to give but one example, for data exchange with a data system external to the data terminal 10, during docking periods, for example, when the batteries 265 are being recharged. External power may temporarily be applied to the data terminal 10 while the data terminal is located in the docking device 110 (see FIG. 4). Such external power may be used to conserve power consumption from the power pack 265 and to recharge the power pack 265 as needed.

Detailed Description Text (53):
The I/O board 177 further features a pod connector 365, through which connection is made to the respective accessory panel or pod 30 and to any respective data collection or communications device located therewith. The pod connector 365 is communicatively coupled to the I/O signal and control bus 340, just as the Dual UART device 355 and the Ethernet controller 345. The accessory pod 30 may, for example, contain the described bar code scanner 29. The accessory pod or panel 30 may instead house data communications apparatus, such as an RF transceiver, or a modem. The accessory pod 30 may be controlled internally by a microprocessor circuit of its own for processing data in accordance with the function of the respective accessory device, the processed data then being transferred to the data terminal 10 via the I/O signal and control bus 340. However, data flow between the data terminal 10 and the accessory pod 30 is preferably controlled by the data terminal 10 by control signals from the main circuit board 219 applied via the I/O signal and control bus 340.

Detailed Description Text (56):

A control bus 407 couples the communications interface device 325 to the VGA controller 366. The switch 332 is manually activated instead of directly by a special memory card, though such an interaction is considered to be an option. The switch 332 may now be operated manually in conjunction with an ON/OFF switch of the data terminal 10 when a special memory card is present and the memory address function is to be altered through the memory card. Though an active pen operated digitizing array may be used, the described touch sensitive pad 229 is preferred as an overlay over the LCD screen 15. An analog-to-digital signal converter 408 (A/D CONV) is coupled to the touch sensitive screen or pad 229. A touch screen control line 409 leads to the converter 408, and digital signals are obtained via the data bus 410, as obtained from an analog voltage output via line 411 from the touchpad 229

Detailed Description Text (57):
FIG. 22 is a flow chart of an interaction between both a control program as it may reside in memory of the data terminal 10, and certain circuit states of the circuit functions of the circuit board 219, for example. The operation of the data terminal 10 is comprised of separate functions of executing application programs or "performing application tasks", such as collecting, processing or communicating data messages, and a continuous power management procedure. Pursuant to the unique power management procedure which is enabled by the described circuit function, power to the data terminal 10 may be shut down any time the data terminal 10 is not in use, or during any of a number of alarm or defect conditions. Such defect condition may occur when the operating voltage falls below a desirable minimum voltage, or when an operator seeks access to the data terminal 10 in a manner which may cause an inadvertent power failure.

Detailed Description Text (58):
Referring specifically to FIG. 22, hardware activity may activate the data terminal 10, for example, by an operator "turning on" the data terminal 10. When a "CTS" (clear to send) signal goes from low to high, power is applied and the microprocessors 310 and 368 may be reset. At that time the software or the control functions of the data terminal 10 take over. The voltage is checked and would be compared to a preset minimum (or even maximum) voltage. If the voltage check is "OK", a memory check is performed. If the memory check is passed, all states of the data terminal 10 prior to shut down are restored ("RESTORE STATE"). Thus, whatever operation may have been performed prior to shutdown, the data terminal 10 becomes enabled to resume that operation. Thus, unless other operations are initiated, the ("RESUME") step is executed. If a memory check fails, a full reset will be performed.

Detailed Description Text (59):
Further in reference to FIG. 22, a timed activity monitoring function may be executed by the maintenance processor 368 (see FIG. 20). For example, if there is no activity within ten seconds, the states of the data terminal 10 are again saved, as well as memory and data states, and the data terminal 10 is powered down, at which time all software functions necessarily stop because of lack of power. It now takes mechanical or hardware action, as explained, to again power up the data terminal 10. However, because all states are saved, operation of the data terminal 10 is resumed at the point of operation at which power down operation was initiated.

Detailed Description Text (60):
If there is system activity, or if there has been system activity within a preset monitoring period, such as the ten-second period, the data terminal 10 will continue to perform its tasks. Voltage levels are polled in preferred intervals. A preferred interval is once every millisecond or 1000 times per second. This polling activity is an activity performed by the maintenance microprocessor 368. As soon as a low voltage condition is detected, the shut down sequence is initiated. The active states are saved to shadow ram, and the data terminal 10 is powered down by removing power. Further activity stops, but the most recent active states of all devices including the I/O states, are preserved. Thus, when an operator pushes a designated keyboard function switch, for example, the operation of the data terminal 10 may be resumed.

Detailed Description Text (63):

FIG. 25 shows a sequence diagram whereby in step 431 the communications interface 325 checks the special key and enables the master mode just described. In step 432 the microprocessor 310 is disabled by the tri-state mode via a signal over control line 426. In step 433, the microprocessor 368 takes over as described to set flags and registers to direct communications of the microprocessor 310 to the special PCMCIA card at the slot 191, for example. In step 434, the microprocessor 310 is reset, and while reset is taking place, the maintenance or control microprocessor 368 disables, through step 435, the signal at 426, returning the applications microprocessor 310 to its normal operation. However, because of the specially set flags and registers, the SCAMP device 314 directs the request for data from the microprocessor 310, instead of to the flash memory 330, to a PCMCIA controller 436 located on the I/O board 177.

Detailed Description Text (66):
For example, the radio 452 operating in the 2.4 to 2.4835 GHz spread spectrum band, such as a Norand 2.4 GHz band radio, uses a 1 MHz size data transmission channel that hops over 82 channels with an effective raw data rate of 1 Mbps; radiating at 65 milliwatts of power, it can typically cover from 25,000 to 70,000 square feet with a process gain of 10 dB. The relatively low power output is a consequence of limits placed on the standards for PCMCIA cards. This standard limits power on any PCMCIA card to 100 mW. This 2.4 GHz Band radio on a Type II PCMCIA card is structured to conform to the OSI seven-layer communications model.

Detailed Description Text (67):
FIG. 28 is a logical representation of communication layers of the 2.4 MHz band radios 452 in the network system 439. The radio 452 and MAC sub-layers 455 are incorporated on the aforesaid radio card, together with an interface 457 to the remaining layers of software that are incorporated into the operating systems of the terminals 454 and the base stations 453. The upper software layers deal with protocols 459, such as routing and application interface issues. The base stations 453 also have physical and MAC sublayer support 460 and adaptors 461 for connecting to the Ethernet LAN 442. The MAC sub-layers 455 provide an asynchronous data delivery service that is equivalent to the service provided by Ethernet. It is a best effort datagram delivery service with low delay that readily supports typical bursty LAN applications, such as file access, client/server applications, printing, and e-mail.

Detailed Description Text (68):
The MAC layer 455 operates on a positive acknowledgment protocol. Each time a data packet is sent, the sending station expects to receive an acknowledgment packet from the receiving station indicating that the data packet was received without error. If the acknowledgment doesn't arrive within a specific short time interval, the sending station retransmits the data packet. This process is repeated until the data packet is acknowledged to have been received successfully, or a retransmission limit value is exceeded. These retransmissions are completely transparent to the host computer 446 and upper layer software.

Detailed Description Text (69):
Since multiple terminals 454 and base stations 453 will be sharing the radio medium, and since retransmissions due to collisions (two radios sending data at the same time) are wasteful on the power supply, the radio system employs a virtual collision detect scheme to minimize collisions. Another reason for collision detection is to conserve bandwidth. If a collision occurs during a data packet transmission, the radio bandwidth is occupied unproductively for as long as the time it takes for the longest colliding data packet to complete transmission. To avoid collision, and to resolve contention for the bandwidth, the first packet that a sender transmits is a "request to send" packet. When the receiver sends a "clear to send" packet, the sender is reasonably assured of having the radio channel clear to send the actual data packet(s). Since the "request" and "clear" packets include the length of the actual data packets, other devices on the network 439 are aware of how long the radio bandwidth will be occupied, and will not even attempt a "request to send" transmission during that period. With this approach, only "request" packets are subject to routine collisions. However, since they are very small sized packets, the time and power wasted is minimal.

character is displayed. The display is an immediate feedback as to whether the correct character has been recognized. If an incorrect character appears, a graphic correction is made as a deviation with respect to the displayed character. Various other advantages will appear from further description of a preferred embodiment of the invention.

Detailed Description Text (87):
FIG. 33 shows a modification of the data terminal 510 as shown in FIG. 31, in that an optional indicia reader module 660 is shown attached to the upper end 639. The indicia reader may for example be a laser scanner bar code reader having an optical window 661 through which a laser beam cyclically scans across a bar code and through which a selectively reflective signal is received by the reader 660.

Detailed Description Text (88):
It is to be understood that the device provided by the accessory pod 30 may be a scanner including a laser scanner, an indicia reader, a wireless receiver, or a variety of other devices suitable for use with the portable data collection terminal 10.

Detailed Description Text (94):
Appendix C, entitled "PEN*KEY.TM. Hand-held Computer" shows features and specifications of a commercial version of the illustrated embodiment.

Detailed Description Text (98):
Appendix G, entitled "Wireless Network-Enabled PEN*KEY.TM. Computer" contains a further detailed description of a wireless network-enabled hand-held terminable usable in an embodiment of the present invention.

Detailed Description Text (102):
Appendix K, PEN*KEY.TM. Hand-Held Computer Theory of Operation, 1st Edition August 1994, Norand (table of contents, 3 pages; record of revisions, 1 page; pages 2-1 through 2-27).

Detailed Description Text (103):
Appendix L, PEN*KEY.TM. Hand-Held Computer Maintenance, Norand (table of contents, 1 page; pages 3-1 through 3-10).

Detailed Description Text (105):
Appendix N, PEN*KEY.TM. Hand-Held Computer Specifications (2 pages).

Current US Original Classification (1):
361/683

Other Reference Publication (3):
*Norand News Release, entitled "Integrated Scanning Expands PEN*KEY.TM. 6300 Hand-Held Personal Computer Functionality", dated Nov. 1, 1994.

CLAIMS:

54. The portable computer terminal system of claim 48, wherein the display comprises a digitizer display screen lying substantially parallel to the frontal side during use of the terminal system, and operable to receive handwritten signatures input to the digitizer display screen.

115. The portable data collection terminal system of claim 113, wherein said display screen comprises a digitizer display screen operable to receive handwritten signatures input to said digitizer display screen.

WEST

End of Result Set

Generate Collection Print

L19: Entry 1 of 1 File: USPT Sep 8, 1998

DOCUMENT-IDENTIFIER: US 5805474 A
TITLE: Portable work station type-data collection system having an improved handgrip and an optical reader to be directed thereby

US PATENT NO. (1):
5805474

Abstract Text (1):
A portable data collection terminal system has a housing having a display screen with coincident graphic data input and a keyboard on the frontal side thereof. An accessory pod, having a width less than the width of the display screen and a handgrip extension adapted to hold a selected accessory device, such as a laser scanner, is disposed on the housing, opposite said frontal side. The accessory pod has one or two activation, diaphragm-type switches disposed in a pod wall disposed transversely to the handgrip extension and extending outwardly from, opposite the frontal side, the housing. The switch or switches are connected in parallel, if more than one, and are disposed near an end of the pod wall such that they are operable by either a user's thumb or finger.

Brief Summary Text (16):
Yet another object of the invention is a power management control function implemented through software controlled microprocessor functions, the power management function including selectively shutting the data terminal down without loss of current data interchange status states on an Input-Output bus (I/O Bus).

Brief Summary Text (17):
According to one aspect of the invention, it is consequently contemplated to increase the data input capacity of a portable data terminal with a touch sensitive liquid crystal display overlay. The touch sensitive display overlay may function as a keyboard or as a provision for entering graphic data such as signatures. Another keyboard may be a numerical keyboard or may be activated as a function keyboard to supplement a touch sensitive keyboard implemented as an overlay of a display screen.

Brief Summary Text (19):
In a particular embodiment in accordance with the invention, keys of the touch sensitive keyboard of the display screen of the portable data terminal may be selectively reorientable with respect to the data terminal. In accordance with a particular feature of the invention, the keys or key areas of the touch sensitive keyboard are reoriented by switching key assignment areas within the touch sensitive display screen and by reorienting indicia within each of the switched touch sensitive areas of the board to change the orientation of the indicia to correspond to a change orientation of the keyboard of the touch sensitive area.

Brief Summary Text (21):
Also according to the present invention, a data terminal has a display screen and graphic data input surface coincident with and disposed beneath the display screen. Data input into the graphic data input surface may be obtained either via an electromagnetic pen, also referred to as an active pen, or via a touch sensitive screen via a pointed object, such as a stylus.

Brief Summary Text (23):
Further in accordance herewith, a data terminal includes a shock and weather resistant housing and a keyboard orientation with respect to a display screen which causes an included angle to protect both the keyboard and the display screen from contact with a flat hard bottom surface during a fall of the data terminal against such surface. Co-molding of shock absorbing material to the surface of the housing distributes impact forces to which the data terminal may be exposed as a result of a fall. In a preferred embodiment, resilient sealing strips interposed between access covers and the housing provide a weather-sealed housing.

Brief Summary Text (24):
A housing of the data terminal includes top and bottom or base housing shells. The base housing shell is an accessory base and has a central accessory attachment opening. The accessory attachment opening or accessory pod opening may by covered by a removable base cover when no accessory pods are attached. A base cover in accordance herewith is in a shape of a multi-function handgrip or terminal grip and stabilizer. The handgrip comprises a longitudinally centered concave, transversely peaked stabilizer shape with dual, laterally offset, symmetrical handgrip ridges with palmrest indentations for alternatively left and right hand gripping functions. The dual handgrip ridges include co-molded ribbing which also provides impact resistance. The removable base cover may be exchanged for an accessory pod which is centrally disposed, symmetrically with respect to a longitudinal central axis of the housing of the data terminal. The accessory pod has a width transverse to the longitudinal axis which is less than the transverse width of the data terminal, the accessory pod including a handgrip portion by which an operator may hold the data terminal while operating the data terminal.

Drawing Description Text (3):
FIG. 1 shows a pictorial frontal view of a data terminal showing a top shell of a housing with a touch sensitive display screen in combination with a keyboard in accordance with an embodiment of the present invention;

Drawing Description Text (24):
FIG. 22 is a control logic flow diagram of a sequence to be followed during power up or power down operations of a data terminal in accordance with an embodiment of the invention;

Drawing Description Text (33):
FIG. 31 is a frontal view of a data terminal showing a touch sensitive display screen in combination with a keyboard in accordance with an embodiment of the present invention;

Detailed Description Text (2):
FIG. 1 shows a portable data collection terminal or data terminal which is designated generally by the numeral 10. The data collection terminal 10 is a handheld, portable unit, which is understood in the art as being powered by a self-contained power source. Such a portable data terminal 10 may operate in what is referred to as a batch mode in which data are collected by, and stored within, the data terminal 10 to be transferred to an alternate data processing unit or host computer (not shown) in a comprehensive "batch" type data transfer operation. In the alternative, the data terminal 10 may be in communication with such a host computer in an interactive or on-line mode via a data communications link, such as a radio frequency transceiver arrangement or a cable-type communications connection.

Detailed Description Text (3):
The data terminal 10, as described herein and as viewed from above, has an elongate, generally rectangularly shaped housing 12. The elongate housing 12, preferably of a high-impact-strength plastic material, encases the data terminal 10. Various types of moldable high-impact-strength plastic materials are known and are generally available. The pictorial representation of the data terminal 10 in FIG. 1 depicts prominently a frontal shell or top shell 14 of the housing 12. A display screen 15 and a keyboard 16 are located, respectively, in an upper end portion 17 and a lower end portion 18 adjacent an upper end 19 and a lower end 20 of the housing 12.

Detailed Description Text (8):

connector and power strap 199. A resilient gasket 205, coated with a contact adhesive, is placed about the periphery of the base shell accessory opening 93. The annular outline of the gasket 205 indicates comparatively the outline of the accessory opening 93 which is otherwise partly concealed in the pictorial view of FIG. 11.

Detailed Description Text (47):
FIG. 21 depicts functional elements which are mounted on the special input-output function interface board 177 ("I/O BD"), further referred to as I/O board 177. An advantage of the use of the I/O board 177 as an addendum to, but as a separate structural element from, the main circuit board 219, for example, is an increased ease of assembly and a promotion of modular concepts. A use of modular concepts permits the data terminal 10 to be adapted to special uses. In reference to FIGS. 20 and 21, the preferred functional layout of a combination of the main circuit board 219 and the I/O board 177 shows that substantially all internal operational functions of the data terminal 10, those which are expected to remain the same for most, if not all, applications, are supported by the main circuit board 219. On the other hand, input-output functions may vary among different special use applications of the data terminal 176. The less permanently defined input-output functions are therefore found on the I/O board 177. The data terminal 10 may therefore undergo a basic functional modification by the removal of the I/O board 177 for a different I/O board with different input-output functions. Components on the main circuit board 219 need therefore not be changed. However, with changed input-output functions and parameters, a control program which would be resident in the flash memory 330 may need to be updated to account for changes in operating default settings of now different input-output functions as provided by a different I/O board.

Detailed Description Text (50):
A second desirable communications controller on the I/O board 177 is a Dual UART device 355. The Dual UART (Universal Asynchronous Receive and Transmit) device 355 is coupled internally of the data terminal 10 to the I/O signal and control bus 340 and for external communications to respective RS 232 and RS 485 control circuit devices 356 and 357, respectively. In furtherance of advantages obtained through a dual coupling function via both the connector 178 and surface contacts 106, standard connections of the RS 232 and RS 485 devices, 356 and 357, are also contemplated to be coupled to designated control and data terminations on the 28-pin connector 178 and respective ones of the surface contacts 106. The portable data terminal 10 may typically not be regarded as the type of device the usefulness of which may be enhanced by linking provisions to communication networks such as Ethernet. However, it has been discovered that a full function of the data terminal 10 is implemented only when an efficient operation of collecting data at the working level of a complex data system is supplemented by equally efficient communications with the data system. In furtherance of this, Ethernet capability is found to provide a communications link of significance. Ethernet may be used, to give but one example, for data exchange with a data system external to the data terminal 10, during docking periods, for example, when the batteries 265 are being recharged. External power may temporarily be applied to the data terminal 10 while the data terminal is located in the docking device 110 (see FIG. 4). Such external power may be used to conserve power consumption from the power pack 265 and to recharge the power pack 265 as needed.

Detailed Description Text (53):
The I/O board 177 further features a pod connector 365, through which connection is made to the respective accessory panel or pod 30 and to any respective data collection or communications device located therewith. The pod connector 365 is communicatively coupled to the I/O signal and control bus 340, just as the Dual UART device 355 and the Ethernet controller 345. The accessory pod 30 may, for example, contain the described bar code scanner 29. The accessory pod or panel 30 may instead house data communications apparatus, such as an RF transceiver, or a modem. The accessory pod 30 may be controlled internally by a microprocessor circuit of its own for processing data in accordance with the function of the respective accessory device, the processed data then being transferred to the data terminal 10 via the I/O signal and control bus 340. However, data flow between the data terminal 10 and the accessory pod 30 is preferably controlled by the data terminal 10 by control

signals from the main circuit board 219 applied via the I/O signal and control bus 340.

Detailed Description Text (57):
FIG. 22 is a flow chart of an interaction between both a control program as it may reside in memory of the data terminal 10, and certain circuit states of the circuit functions of the circuit board 219, for example. The operation of the data terminal 10 is comprised of separate functions of executing application programs or "performing application tasks", such as collecting, processing or communicating data messages, and a continuous power management procedure. Pursuant to the unique power management procedure which is enabled by the described circuit function, power to the data terminal 10 may be shut down any time the data terminal 10 is not in use, or during any of a number of alarm or defect conditions. Such defect condition may occur when the operating voltage falls below a desirable minimum voltage, or when an operator seeks access to the data terminal 10 in a manner which may cause an inadvertent power failure.

Detailed Description Text (61):
FIG. 23 shows preferred functions of the communications interface circuit 325. The respective address, data and control buses 311-313 from the microprocessors 310 and 368 lead into a processor interface and contention resolution circuit 415. From the interface 415, an address bus 416 and a data bus 417 provide for selective addressing and operation of an A/D converter function 418, a sleep mode function 419, the control 420 of interaction between the applications and maintenance microprocessors 310 and 368, the maintenance microprocessor interrupt control 421 and a general system control function 422 which addresses and operates the various other functions as hereinbefore described, and through which status data may be received via status bus 423. The communications interface circuit 415 is further improved with a maintenance processor master mode function 425. The master mode function 425 may be triggered by a signal from the communications interface circuit 325 to the applications microprocessor 310 to tri-state or neutralize output signals from the microprocessor 310. The tri-stating signal is applied via control line 426, effectively rendering the applications microprocessor 310 non-functional. The procedure may be used in conjunction with a special memory card on start up, by depressing the switch 332 shown in FIG. 20 in conjunction with powering up the data terminal 10. The procedure may be used when the BIOS program residing in the flash memory device 330 (FIG. 20) has become defective and is to be restored, or when a new BIOS is to be loaded into the flash memory device 330. Accordingly, during such controlled start up, the maintenance microprocessor 368 takes over the setup function of the data terminal, acting in place of the applications microprocessor 310 to cause the microprocessor 310, upon a further reset command, to address the special memory card from the card slot 191, for example, instead of fetching instructions from the flash memory 330.

Detailed Description Text (64):
FIG. 26 shows a data flow during such altered address states. The microprocessor 310 bypasses the flash memory 330 and, instead, sends and receives data and address codes through the SCAMP device 314 and respective buses 321 and 322 and through the controller 436 from a special memory card 437.

Detailed Description Text (67):
FIG. 28 is a logical representation of communication layers of the 2.4 MHz band radios 452 in the network system 439. The radio 452 and MAC sub-layers 455 are incorporated on the aforesaid radio card, together with an interface 457 to the remaining layers of software that are incorporated into the operating systems of the terminals 454 and the base stations 453. The upper software layers deal with protocols 459, such as routing and application interface issues. The base stations 453 also have physical and MAC sublayer support 460 and adaptors 461 for connecting to the Ethernet LAN 442. The MAC sub-layers 455 provide an asynchronous data delivery service that is equivalent to the service provided by Ethernet. It is a best effort datagram delivery service with low delay that readily supports typical bursty LAN applications, such as file access, client/server applications, printing, and e-mail.

Detailed Description Text (68):

The MAC layer 455 operates on a positive acknowledgment protocol. Each time a data packet is sent, the sending station expects to receive an acknowledgment packet from the receiving station indicating that the data packet was received without error. If the acknowledgment doesn't arrive within a specific short time interval, the sending station retransmits the data packet. This process is repeated until the data packet. is acknowledged to have been received successfully, or a retransmission limit value is exceeded. These retransmissions are completely transparent to the host computer 446 and upper layer software.

Detailed Description Text (69):
Since multiple terminals 454 and base stations 453 will be sharing the radio medium, and since retransmissions due to collisions (two radios sending data at the same time) are wasteful on the power supply, the radio system employs a virtual collision detect scheme to minimize collisions. Another reason for collision detection is to conserve bandwidth. If a collision occurs during a data packet transmission, the radio bandwidth is occupied unproductively for as long as the time it takes for the longest colliding data packet to complete transmission. To avoid collision, and to resolve contention for the bandwidth, the first packet that a sender transmits is a "request to send" packet. When the receiver sends a "clear to send" packet, the sender is reasonably assured of having the radio channel clear to send the actual data packet(s). Since the "request" and "clear" packets include the length of the actual data packets, other devices on the network 439 are aware of how long the radio bandwidth will be occupied, and will not even attempt a "request to send" transmission during that period. With this approach, only "request" packets are subject to routine collisions. However, since they are very small sized packets, the time and power wasted is minimal.

Detailed Description Text (70):
Any number of the terminals 454 and the base stations 453 can join the radio network 439 automatically. When security is employed, all devices attempting to gain access to the Ethernet LAN 442 via one of the base stations 453 are required to pass a station authentication process. Accepted stations are given a key with which they decode the encrypted data transmissions they receive. Not only is roaming supported, but each of the base stations 453 can employ a different hopping sequence. Thus, for each co-resident ones of the base stations 453 with a different hopping sequence that is added to the network 439, an additional 1 Mbps capacity is added, provided that the terminals 454 are allocated evenly among the different hopping sequences.

Detailed Description Text (80):
A keyboard array 534 of active keys 536 may be displayed on the display screen 515 to correspond to the assigned key areas 536. Each of the key areas forms a discrete functional unit, in that a touch or pressure in any or all portions of such discrete area 536 results in one and the same input signal being generated. Indicia 537 of letters or of control functions also may be displayed directly beneath the respective active key areas 536 of the array 534 on the screen 515. The indicia 537 correspond to and identify input signals generated in response to contacts being made in such designated key areas 536. The display of the keyboard array 534 and of the indicia 537 is desirably selectively activated whenever keyboard entries are to made via the touch sensitive key areas 536. Also, it may be desired to alternate between a display of data as feedback of data entered and the display of the keyboard array 536. In a further variation of the described embodiment it is contemplated to deactivate the touch sensitive active area during periods in which the display screen 515 is used entirely for data display. Another advantage of the bit-mapped display screen 515 and the corresponding identifiable touch sensitive area 532 is that graphic data displaying a customer invoice may have a designated area, selectively activated, for receiving a signature as acknowledgment by a customer. The signature is stored in memory and may be recalled and reproduced on paper copies of the invoice by a central processing station. If all other areas displaying invoice information are deactivated, so as not to receive touch sensitive input, no changes can be made at the time the acknowledgment is requested. The use of alphanumerical data collection is further advanced by character recognition algorithms for processing and storing actual data in response to hand-produced inputs to the screen. For example, the display may provide line spacings as guides for receiving written characters. Within such designated boundaries a sensed pattern of graphic inputs is compared to a character of information. The apparently matching

Detailed Description Text (70):
Any number of the terminals 454 and the base stations 453 can join the radio network 439 automatically. When security is employed, all devices attempting to gain access to the Ethernet LAN 442 via one of the base stations 453 are required to pass a station authentication process. Accepted stations are given a key with which they decode the encrypted data transmissions they receive. Not only is roaming supported, but each of the base stations 453 can employ a different hopping sequence. Thus, for each co-resident ones of the base stations 453 with a different hopping sequence that is added to the network 439, an additional 1 Mbps capacity is added, provided that the terminals 454 are allocated evenly among the different hopping sequences.

Detailed Description Text (75):
In reference to FIG. 31, there is shown a frontal view of a portable data collection terminal or data terminal which is designated generally by the numeral 510. The data collection terminal 510 is a handheld, portable unit, which is understood in the art as being powered by a self-contained power source. Such a portable data terminal 510 may operate in what is referred to as a batch mode in which data are collected by and stored within the data terminal 510 to be transferred to an alternate data processing unit or host computer (not shown) in a comprehensive "batch" type operation. In the alternative, the data terminal 510 may be in communication with such a host computer in an interactive or on-line mode via a data communication link, such as a radio frequency transceiver arrangement. The presence of such a radio transceiver is indicated as an alternative embodiment by a radio antenna 511, shown in phantom lines as the only externally visible element of such a transceiver. An elongate housing 512 preferably of a high-impact-strength plastic material encases the data terminal 510. Various types of materials are known and are commercially available.

Detailed Description Text (79):
In overcoming space restraints on the front surface 514, the display screen 515 is ideally provided with a touch sensitive active surface area 532 as an overlay to the LCD screen for use as a keyboard or graphic data input system. The touch sensitive active surface area 532 may be implemented in a currently preferred embodiment by known technologies which employ, for example, either capacitive or resistive switching and sampling techniques to determine coordinates of a point on the surface area 532 against which a contact pressure is exerted. The overlay area 532 is essentially transparent, such that information displayed on the screen 515 remains clearly discernible. For example, the touch sensitive active area 532 may selectively be configured as a keyboard for manual input of alphabetical characters. In the preferred embodiment the size of the touch sensitive overlay area 532 corresponds to the active display area 519 of the LCD screen 515. It should be noted, however, that such choice is one of convenience, and that less than the active display area 519 of the display screen 515 may be encompassed by the touch sensitive active area 532.

Detailed Description Text (80):
A keyboard array 534 of active keys 536 may be displayed on the display screen 515 to correspond to the assigned key areas 536. Each of the key areas forms a discrete functional unit, in that a touch or pressure in any or all portions of such discrete area 536 results in one and the same input signal being generated. Indicia 537 of letters or of control functions also may be displayed directly beneath the respective active key areas 536 of the array 534 on the screen 515. The indicia 537 correspond to and identify input signals generated in response to contacts being made in such designated key areas 536. The display of the keyboard array 534 and of the indicia 537 is desirably selectively activated whenever keyboard entries are to made via the touch sensitive key areas 536. Also, it may be desired to alternate between a display of data as feedback of data entered and the display of the keyboard array 536. In a further variation of the described embodiment it is contemplated to deactivate the touch sensitive active area during periods in which the display screen 515 is used entirely for data display. Another advantage of the bit-mapped display screen 515 and the corresponding identifiable touch sensitive area 532 is that graphic data displaying a customer invoice may have a designated area, selectively activated, for receiving a signature as acknowledgment by a customer. The signature is stored in memory and may be recalled and reproduced on paper copies of the invoice by a central processing station. If all other areas